



PATENT APPLICATION  
Attorney's Do. No. 1941-70

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Paul J. BRUINSMA, Suresh BASKARAN, Jagannadha R. BONTHA  
and Jun LIU

Serial No.: 09/481,988

Group No.: 1755

Filed: January 11, 2000

Examiner: P. Marcantoni

For: MESOPOROUS-SILICA FILMS, FIBERS, AND POWDERS BY EVAPORATION

ATTENTION: Board of Patent Appeals and Interferences  
Commissioner of Patents and Trademarks  
Washington, D.C. 20231

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APPELLANT'S BRIEF

UNDER 37 CFR §1.192

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This Appeal Brief is in furtherance of the Notice of Appeal filed herewith. Appeal is taken from the Examiner's Office Action mailed July 16, 2002 finally rejecting claims 116-128.

The fees required under 37 C.F.R. §1.17(c) and any required petition for extension of time for filing this Brief and fees therefor are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

This Brief is transmitted in triplicate.

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This Brief contains these items under the following headings, and in the order set forth below.

## **TABLE OF CONTENTS**

- I. REAL PARTY IN INTEREST
- II. RELATED APPEALS AND INTERFERENCES
- III. STATUS OF CLAIMS
- IV. STATUS OF AMENDMENTS
- V. SUMMARY OF INVENTION
- VI. ISSUES ON APPEAL
- VII. GROUPING OF CLAIMS
- VIII. ARGUMENT
- IX. APPENDIX

### **I. REAL PARTY IN INTEREST**

#### **37 CFR §1.192(c)(1)**

The present application has been assigned to the following party:

BATTELLE MEMORIAL INSTITUTE  
902 Battelle Blvd.  
P.O. Box 999 MS K1-53  
Richland, WA 99352

### **II. RELATED APPEALS AND INTERFERENCES**

#### **37 CFR §1.192(c)(2)**

The Board's decision in the present Appeal will not directly affect, or be directly affected, or have any bearing on, any other appeals or interferences known to the appellant, or to the appellant's legal representative.

### **III. STATUS OF CLAIMS**

#### **37 CFR §1.192(c)(3)**

Status of All the Claims:

1. Claims presented: 1-128
2. Claims withdrawn from consideration but not cancelled: NONE
3. Claims canceled: 28-39, 42-57, 61-68, 72-77, 89, 96-97, 99-108
4. Claims pending: 1-27, 40, 41, 58-60, 69-71, 78-88, 90-95, 98, 109-128  
of which:
  - a. Claims allowed: 1-27, 40, 41, 58-60, 69-71, 78-88, 90-95, 98, 109-115
  - b. Claims rejected: 116-128

All pending rejected claims, namely claims 116-128, are being appealed. The appealed claims are eligible for appeal, having been finally (twice) rejected.

### **IV. STATUS OF AMENDMENTS**

#### **37 CFR §1.192(c)(4)**

Subsequent to the last Office Action mailed on: July 16, 2002, which contained a Final rejection of the appealed claims:

No amendment has been filed.

### **V. SUMMARY OF THE INVENTION**

#### **37 CFR §1.192(c)(5)**

This invention pertains to the development of the surfactant-templated, nanometer-scaled porosity of a precursor solution (generally including a precursor, a surfactant and a solvent) and forming a mesoporous material by first forming the precursor solution into a preform having a high surface area to volume ratio, then rapid drying or evaporating a solvent from the silica precursor solution. The mesoporous material may be in any geometric form, but is preferably in the form of a film, fiber, powder or combinations thereof. The rapid drying or evaporation of solvent from the solution is accomplished by forming a preform by any layer thinning technique, e.g. spin casting, drawing or spraying.

## **VI. ISSUES ON APPEAL**

### **37 CFR §1.192(c)(6)**

A. Whether claims 116-128 are unpatentable either under 35 U.S.C. §112, first paragraph, or 35 U.S.C. § 132, as failing to provide written description support in the specification as originally filed, i.e. as involving new matter, or under 35 U.S.C. § 112, second paragraph, as failing to particularly point out and distinctly claim the subject matter which applicants regard as their invention or as not finding support in the enabling disclosure commensurate in scope with the claims.

## **VII. GROUPING OF CLAIMS**

### **37 CFR §1.192(c)(7)**

#### **A. First Ground of Rejection**

Claims 116-127 were rejected under 35 U.S.C. § 112, first paragraph, as incorporating new matter and claim 128 was rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. All rejected claims were rejected under 35 U.S.C. § 132 as not being supported by a commensurately scoped enabling disclosure. All claim rejections are based in the omission of certain words of limitation from the claims the omission of which are intended to broaden the scope of the claims in reissue.

Rejected claims 116-121 are independent, and omit different claims elements and/or limitations that the Examiner would require to be recited. Thus, each of claims 116-121 stands or falls independently of all others. Rejected claims 122-127 depend respectively from claims 116-121, but add further limitations omitted from their respective base claims, and thus also stand or fall independently of all others. Rejected claim 128 is independent, and thus also stands or falls independently of all others.

**VIII. ARGUMENT**  
**37 CFR §1.192(c) (8)**

**A. Rejections Under 35 U.S.C. §112, First Paragraph**

*Issue 1: Whether the claims omit critical limitations the omission of which introduces new matter into the original application under 35 U.S.C. § 112, first paragraph, and the relevant case law.*

It is impermissible for the Examiner to restrict appellants' claims to recite every detailed limitation found in the Detailed Description of the Invention, as though only a single preferred embodiment or only a single best mode of practicing the invention is patentable, contrary to case law and contrary to the broader suggestions found within the Abstract, Background, Summary and Detailed Description of the Invention. If applicant in reissue cannot obtain claims that cover territory outside the particulars of the various detailed experiments, then there is no need for reissue patent claims at all, since applicant could merely describe the experiments that were done, and the claimed territory would be self-evident from the detailed experimental descriptions. This would be an absurd result contrary to 35 U.S.C. § 112, second paragraph, which requires such claims in all patent applications.

It is uncontested that appellants mistakenly failed to appreciate the proper scope of their invention during the prosecution of the original application. The Examiner concedes that appellants have met the mistake threshold under 35 U.S.C. § 251. The Examiner also concedes that appellants filed the present reissue application within two calendar years of issuance of the original patent, and that, as such, they are entitled to a broadened reissue of the mistakenly under-scoped claims.

The Examiner concedes these points, but nevertheless persists in rejecting claims that omit certain limitations that are mentioned at times in appellants' Description of the Preferred Embodiment(s), denominating such limitations "critical" without explaining where in the specification as a whole he finds support for his "critical" characterization. The Examiner ignores appellants' arguments and citations to the Background, Summary, Description of the

Preferred Embodiment(s) and Abstract of the invention containing suggestions of alternative precursor solutions including non-acid catalysts, non-cationic surfactants and non-aqueous solvents. Furthermore, the Examiner ignores appellants' expert testimonial evidence in support of arguments of what one of ordinary skill in the pertinent art would have known and understood in view of applicants' disclosure about such alternative formulations, i.e. what was the true scope of appellants' original enabling disclosure.

The omission in claims 116-121 of a reference to an acid catalyst, and the omission in claims 118-121 of a reference to a surfactant or a particular surfactant is not new matter. Catalysts and surfactants were known in the prior art and the Jepson-formatted claims recite as inventive steps only that which is new, not that which is admittedly old. The Examiner simply takes the position that an acid catalyst and either an ammonium cationic or alkyl triethylammonium chloride or bromide surfactant is "a critical component" of appellants' claimed method, without citing where in the specification applicants referred to any of these components as being critical to their invention.

In blunt fact, appellant's specification says the opposite: the specification says that these are *not* critical components.

Base catalysts were well known in the type of chemistry recited in the claims' preambles prior to applicants' filing the original Bruinsma patent application, and are cited in the background of the invention and the cited reference to Kresge, et al. For example, a "base catalyst" was described by Kresge, et al., which is cited in the first full paragraph of Bruinsma at column 2.

Moreover, appellants find only one reference to "catalyst" in the Summary, Description of the Preferred Embodiment(s) or Abstract section of the specification. It is at column 6, lines 56-60: "The method of the present invention relies upon a silica precursor mixed with a surfactant in an aqueous solution for templating the silica precursor together with a catalyst (acid) for hydrolysis of the silica precursor." This single parenthetical reference to a preferred catalyst type makes it clear that appellants did not consider the catalyst type critical whatsoever. In view of the background of the invention known to those of skill in the art, base catalysts would have been known to substitute for the preferred (acid) catalyst.

Accordingly, appellants submit that the general term “catalyst” is supported by appellants’ specification.

Similarly, anionic and other neutral surfactants also were well known and were cited in the background of the invention, the cited references to Brinker and Tanev and appellants’ own Example 4. While appellants’ “preferred surfactant” is indeed cationic (Bruinsma, column 7, lines 40-44), appellants have used a non-ionic surfactant in Example 4, which involves dispersion of polyethelene oxide in the dried but un-calcined fiber (see column 12, lines 7-20), a known neutral surfactant. According to *In re Goffe*, 191 USPQ429 (CCPA 1976) and the USPTO’s own MPEP 2164.08(c), a feature described as “preferred” is almost never critical. Tanev (cited in columns 1-2 of Bruinsma) at page 1267 describes the use of a neutral surfactant.

Moreover, appellant finds a number of references in their specification to “surfactant” *without limitation*, including seven in the Summary, four in the Description of the Preferred Embodiment(s) and one in the Abstract sections, for a total of twelve. This widespread use of the general term “surfactant” in the specification, the fact that the only reference to “cationic” surfactant is as a mere preference and the fact that those of skill in the art would have known that other surfactants would substitute for the preferred cationic surfactant refutes any possible characterization of “cationic” as somehow critical to the practice of appellants’ invention, which focuses not on precursor solution chemistries, but instead on mesoporous material production by rapid evaporation.

Accordingly, appellants submit that the general term “surfactant” is supported by appellants’ specification.

The Summary omits the qualification “aqueous” from its broad description of the invention as involving, simply, a “solvent.” (See for example Bruinsma at column 3, lines 39-50). From the Summary and the Abstract, it is clear that the invention does not rely on any particular chemistry--whether involving solvents, surfactants or catalysts—but instead relies on the recited novel and non-obvious steps involving preparing a silica precursor sol using a solvent, dispensing a layer (film, in claim 128) of the sol on a substrate, thinning the layer and forming a templated mesoporous (film, in claim 128) on the substrate by rapid evaporation of the solvent (heating the film, in claim 128).

Indeed, appellants find a number of references in the specification to “solvent” *without limitation*, including seven in the Summary, five in the Description of the Preferred Embodiment(s) and four in the Abstract for a total of sixteen. Clearly, appellants suggested no criticality in the solvent type selection, especially in view of what was known to those of ordinary skill reading the specification and familiar with the background of the invention.

The holdings in *In re Armbruster*, 185 USPQ 152, 512 F2d 676 (CCPA 1975) and *In re Johnson*, 194 USPQ187 (CCPA 1977) both require that the Abstract as well as other parts of the specification be consulted to ascertain what is critical to enabling a particular claim.

The relevant case law compellingly illustrates that a precise definition of materials is not needed when the essence of the invention does not reside in the use of such materials in the claimed process. See *Ex parte McAllister et al.*, 92 USPQ373 (BPAI (formerly BPOA) 1950) and *Ex parte Calingaert et al.*, 52 USPQ 263 (BPAI (formerly BPOA) 1941).

In both of these cases, the Examiner’s final rejection of claims on the grounds of omitted essential matter was *reversed*.

See also *Johnson Worldwide Associates Inc. v. Zebco Corp.*, 50 USPQ2d 1607 at 1613 (CAFC 1999)(application having “heading” term therein with varying meaning, which does not “unambiguously limit” term to only one such meaning, can claim broader meaning); *Ex parte Parks*, 30 USPQ2d 1234 at 1236 (BPAI 1993)(lack of literal support in reissue application for “in the absence of a catalyst” limitation does not establish *prima facie* case for lack of adequate descriptive support); *In re Peters and Anderson*, 221 USPQ 952 at 953 (CAFC 1983)(“[t]he broadened [reissue] claims merely omit an unnecessary limitation that had restricted one element of the invention to the exact and noncritical shape disclosed in the original patent. In sum, nothing in the original disclosure indicates or suggest that the tapered shape of the tips was essential or critical to either the operation or patentability of the invention. Indeed, if the reissue claims had been submitted with the original application, it is difficult to perceive how they could have been properly rejected under § 112.”); and *In re Rasmussen*, 211 USPQ 323 (CCPA 1981)(broadening reissue claim to “adheringly applying” permitted despite specific, originally disclosed embodiment that employed adhesives).

In all reissue cases (the first of this string of cases was an infringement case), the



Examiner in the case was *reversed*.

Nowhere in the original Bruinsma disclosure is the surfactant, catalyst or solvent type within the precursor solution described as being limited to certain chemistries or as being critical to practicing the invention. Appellants note that the Summary of the Invention does not mention a “cationic” surfactant and any reference to “catalyst” is as a product of the process, not as a part of the precursor solution. Nor does the Summary mention “aqueous” solvents. Neither does the Abstract mention “cationic” surfactant, “aqueous” solvent or any “catalyst” whatsoever.

Catalysts, surfactants and solvents are known in the art to be optional, and the omission of details thereof is permissible. The Examiner concedes at page 8 of the Office action mailed July 16, 2002 that “these components are known additives to one of ordinary skill in the art.” Nevertheless, the Examiner would require that such omission be expressed in the original specification.

Appellants submit that what is known to one of ordinary skill in the art need not be expressly set forth to provide an enabling disclosure—otherwise every specification would have to set forth underlying natural and physical scientific principles, e.g. the well-known physical principle of gravitational attraction, the well-known electrical principle of Ohm’s law or the well-known chemical principles governing catalysts, surfactants and solvents.

Expert testimony of record refutes the untenable finding that such limitations are critical to practicing the invention or that the omission of such limitations is tantamount to adding new matter to appellants’ original disclosure.

Dr. Berg is an award-winning and highly published expert in fields including surfactant solutions and self-assembled structures formed therein. He declared under penalty of perjury in a declaration (Exhibit 2 to appellants’ amendment dated November 13, 2000) that, upon his reading of Bruinsma, one of ordinary skill in the related art on August 26, 1997 “would have known that other surfactants, e.g. anionic or non-ionic or amphoteric, can be usefully employed in substitution... [for the ‘preferred’ cationic surfactants reference at Bruinsma, column 7, lines 40-52] in the described process for forming mesoporous films. This is because other surfactants, including non-ionic surfactants, had already been used to make mesoporous powders... .” (Declaration of Dr. Berg at paragraphs 5, 7, 9.)

Dr. Berg also declared under oath that catalysts “are typically either base or acid, and those of skill in the art of sol gel synthesis would have been well aware of the possible substitution of a base catalyst, as described in the alternative in the Brinker patent, for the described acid catalyst of the Bruinsma patent on August 26, 1997. This is because the use of base catalysts had been already reported for synthesizing mesoporous powders using surfactants and inorganic precursors.” (Declaration of Dr. Berg at paragraph 9.)

While there is no expert testimony of record regarding non-aqueous solvents, it is pointed out above that the solitary reference in the Summary, Description of the Preferred Embodiment(s) and Abstract sections of the Bruinsma specification to “aqueous” is to an “aqueous solution” in the general method summary of the invention beginning of that section (quoted above). It is hard to construe that solitary reference in a section headed “Preferred” embodiments as suggesting that aqueous is a critical limitation on “solvent.” In any event, rejected dependent claims 122 through 127--depending respectively from independent claims 116 through 121—add such a limitation and thus would stand notwithstanding the rejection of claims 116 through 121.

There is ample evidence of record in support of appellants’ position that the understood meaning of their original disclosure—when read by one of ordinary skill in the art charged with ordinary knowledge of one so skilled—indeed is broad enough to support claims omitting such unnecessary limitations as “cationic”, “acid” and “aqueous” to describe their surfactant, catalyst and solvent, respectively. Thus, such an omission of terms does not constitute the addition of new matter.

Moreover, *there is no contradictory evidence of record*, nor is there any reason to discount this uncontroverted expert testimony of what one of ordinary skill would have understood from the original Bruinsma disclosure in terms of what it enabled.

Accordingly, under *Johnson Worldwide Associates, Ex parte Parks, In re Peters and Anderson* and *In re Rasmussen*, there is no lawful requirement to read such non-critical limitations into appellants’ claims. Furthermore, under *Ex parte McAllister* and *Ex parte Calingaert*, a precise definition of materials is not required where, as is true in the present case, the essence of the claimed invention does not reside in the use of those materials.

Thus, the requirement that appellants include unnecessarily limiting language of description in their claims--regarding the cationic nature of the surfactant, the presence of a catalyst or the aqueous nature of the solvent--is legal error and should be reversed.

### **Rejections Under 35 U.S.C. §132**

*Issue 1: Whether the claims are supported by the original enabling disclosure of commensurate scope under 35 U.S.C. §132 and the relevant case law.*

Any assertion by the United States Patent and Trademark Office that an enabling disclosure is not commensurate in scope with the protection sought must be supported by evidence or reasoning substantiating the doubts expressed. See *In re Dinh-Nguyen, et al.*, 181 USPQ 46, 492 F2d 856 (CCPA 1974); *In re Bowen*, 181 USPQ 48, 492 F2d 859 (CCPA 1974); and *In re Armbruster*, 185 USPQ 152, 512 F2d 676 (CCPA 1975).

Catalysts, surfactants and solvents are known in the art to be optional, and the omission of details thereof is permissible. The Examiner concedes at page 8 of the Office action mailed July 16, 2002 that “these components are known additives to one of ordinary skill in the art.” Nevertheless, the Examiner would require that such omission be expressed in the original specification. It appears the Examiner’s position is that nothing may ever be left to interpretation in view of what one of ordinary skill already knows when an application is filed, that instead somehow all known bases in fact must be expressly disclosed. This is contrary to the case law, which clearly states that a specification is written for one of ordinary skill in the art presumed to be knowledgeable in the field.

Patent disclosures need not teach that which is already known to one of ordinary skill in the relevant art. See *Atmel Corp. v. Information Storage Devices, Inc.*, 53 USPQ2d 1225 at 1230 (CAFC 1999). See also *In re Wands*, 8 USPQ2d 1400 at 1402 (CAFC 1988) and *Spectra Physics v. Coherent*, 3 USPQ2d 1737 at 1743 (CAFC 1987). Indeed, these opinions go beyond saying patent disclosures *need* not teach what is already known. They go so far as to say patent disclosures *should not* teach what is already known. Appellants submit that their disclosure is enabling of the invention as defined in the rejected claims under the relevant case law.

Dr. Berg is an award-winning and highly published expert in fields including surfactant solutions and self-assembled structures formed therein. He declared under penalty of perjury in a declaration (Exhibit 2 to appellants' amendment dated November 13, 2000) that, upon his reading of Bruinsma, one of ordinary skill in the related art on August 26, 1997 "would have known that other surfactants, e.g. anionic or non-ionic or amphoteric, can be usefully employed in substitution... [for the 'preferred' cationic surfactants reference at Bruinsma, column 7, lines 40-52] in the described process for forming mesoporous films. This is because other surfactants, including non-ionic surfactants, had already been used to make mesoporous powders... ." (Declaration of Dr. Berg at paragraphs 5, 7 and 9.)

Dr. Berg also declared under oath that catalysts "are typically either base or acid, and those of skill in the art of sol gel synthesis would have been well aware of the possible substitution of a base catalyst, as described in the alternative in the Brinker patent, for the described acid catalyst of the Bruinsma patent on August 26, 1997. This is because the use of base catalysts had been already reported for synthesizing mesoporous powders using surfactants and inorganic precursors." (Declaration of Dr. Berg at paragraph 9.)

Appellants submit that, from the above arguments regarding aqueous solvents and solutions, described with such qualification only once out of sixteen references (that solitary reference being within the Description of the *Preferred* Embodiment(s) section of the specification, does not limit the enabling scope of the specification. This is especially so when the focus of the invention, as recited in the Jepson-formatted claims being appealed herein, is not on the precursor solution's chemistry but rather on its preparing, dispensing onto a substrate and thinning the dispensed precursor sol layer and rapidly evaporating it to form a templated mesoporous material on the substrate.

Thus, there is ample evidence of record in support of appellants' position that the understood scope of their original disclosure—when read by one of ordinary skill in the art charged with ordinary knowledge of one so skilled—indeed is commensurate in scope with the claims omitting such unnecessary limitations as "cationic", "acid" and "aqueous" to describe their surfactant, catalyst and solvent, respectively.

Moreover, *there is no contradictory evidence of record*, nor is there any reason to

discount this uncontroverted expert testimony of what one of ordinary skill would have understood from the original Bruinsma disclosure in terms of what it enabled.

Accordingly, there is no evidence of record, and there has been no such substantive showing, that applicants' original disclosure fails to support the rejected claims. Accordingly, this rejection should be reversed.

### **C. Rejection Under 35 U.S.C. §112, Second Paragraph**

*Issue 1: Whether claim 128 is indefinite under 35 U.S.C. § 112, second paragraph, and the relevant case law.*

It is the Examiner's position that the original specification will only support a sequential and segregated heating and calcining process in which films are heated in one step at the exact temperature used in the research examples and calcined in another step at a different exact temperature. Applicants most strongly disagree.

Although these steps are sequential over a wide temperature range, it is well known in the art that this process can be done continuously and that it is not possible to precisely define where drying ends and calcining begins. Furthermore, there is a known trade-off between temperature and exposure times. In other words, a film may be calcined at a relatively low temperature if the exposure time is long enough.

The Description of the Preferred Embodiment(s) section of the Bruinsma specification explains that "[a] third step of heating may be used to remove any residual solvent and to further condense the silica, followed by calcining which further removes any residual surfactant." (Bruinsma column 7, lines 3 through 5.) A requirement for definitive, segregated steps thus is not present in the description of appellants' invention. The example cited by the Examiner in this regard (see Bruinsma, column 11, lines 25-26) is improper, since that refers to an example for making mesoporous *powders*, not *films*.

The example for films is provided at column 9, lines 7 through 10. Although this example describes exposure for several hours at a specific temperature followed by calcining at a specific temperature, it is again appellants' position that limiting the scope of the invention to

exactly the conditions used in the “Examples” is improper. The sequential drying and calcining process that occurs as a result of heating the film to between 105 degrees C and 600 degrees C is not indefinite and the fact that the Examiner wished to make it so does not change the fact that drying and calcinations can occur throughout this continuum.

Accordingly, the indefiniteness rejection is overcome, and should be reversed.

**A. IX. APPENDIX**

**37 CFR §1.192(c) (9)**

The text of the claims on appeal (after entry of the July 8, 2002 amendments thereto) is:

Claims 116-128, as follows:

116. A method of forming templated mesoporous material on a substrate from a silica precursor solution containing an alkoxide silica precursor, and ammonium cationic surfactant and a solvent, while avoiding gelation, precipitation and non-porous or lamellar structures, wherein the improvement comprises the steps of:

- (a) preparing said silica precursor solution using a solvent;
- (b) dispensing a layer of said precursor solution on said substrate;
- (c) thinning said layer by spin casting; and
- (d) forming templated mesoporous material on said substrate by evaporation of the solvent in less than 5 minutes.

117. A method of forming templated mesoporous material from a silica precursor solution containing an alkoxide silica precursor, an ammonium cationic surfactant and a solvent, while avoiding gelation or precipitation or non-porous or lamellar structures, wherein the improvement comprises the steps of:

- (a) preparing said silica precursor solution using a solvent;
  - (b) spin casting, drawing, spraying or squeegeeing said silica precursor solution;
- and
- (c) evaporating the solvent in less than 5 minutes to form templated mesoporous material.

118. A method of forming templated mesoporous material on a substrate from a silica precursor solution containing an alkoxide silica precursor, an amount of surfactant great enough to avoid a non-porous film but not enough to produce a lamellar structure, and a solvent, while avoiding gelation or precipitation, wherein the improvement comprises the steps of:

- (a) preparing said silica precursor solution using a solvent;
- (b) dispensing a layer of said precursor solution on said substrate;
- (c) thinning said layer by spin casting; and
- (d) forming templated mesoporous material on said substrate by evaporation of the solvent in less than 5 minutes.

119. A method of forming templated mesoporous material from a silica precursor solution containing an alkoxide silica precursor, a surfactant and a solvent, while avoiding gelation or precipitation and non-porous or lamellar structures, wherein the improvement comprises the steps of:

- (a) preparing said silica precursor solution using a solvent;
  - (b) spin casting, drawing, spraying or squeegeeing said silica precursor solution;
- and
- (c) evaporating the solvent in less than 5 minutes to form templated mesoporous material.

120. A method of forming templated mesoporous material on a substrate from a silica precursor solution containing an alkoxide silica precursor, and a solvent, while avoiding gelation or precipitation and non-porous or lamellar structures, wherein the improvement comprises the steps of:

- (a) preparing said silica precursor solution using a solvent;
- (b) dispensing a layer of said precursor solution on said substrate;
- (c) thinning said layer by spin casting; and
- (d) forming templated mesoporous material on said substrate by evaporation of the solvent in less than 5 minutes.



121. A method of forming templated mesoporous material from a silica precursor solution containing an alkoxide silica precursor, and a solvent, while avoiding gelation or precipitation and non-porous or lamellar structures, wherein the improvement comprises the steps of:

- (a) preparing said silica precursor solution using a solvent;
- (b) spin casting, drawing, spraying or squeegeeing said silica precursor solution;

and

(c) evaporating the solvent in less than 5 minutes to form templated mesoporous material.

122. The method of claim 116, wherein the solvent is an aqueous solvent.

123. The method of claim 117, wherein the solvent is an aqueous solvent.

124. The method of claim 118, wherein the solvent is an aqueous solvent.

125. The method of claim 119, wherein the solvent is an aqueous solvent.

126. The method of claim 120, wherein the solvent is an aqueous solvent.

127. The method of claim 121, wherein the solvent is an aqueous solvent.

128. (Amended) A calcined mesoporous silica film on a substrate formed by a process comprising:

dispensing a catalyst- and silica precursor- and solvent- and surfactant-containing solution on the substrate;

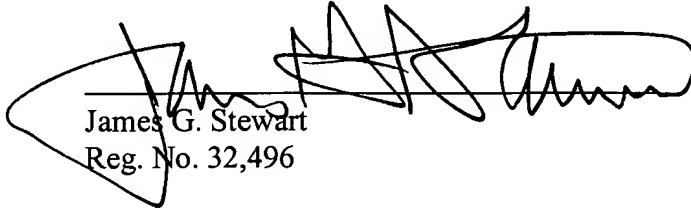
forming a film on the substrate by rapid evaporation of the solution on the substrate; and

heating the film on the substrate to a temperature of between about 105 degrees C and about 600 degrees C to decompose the surfactant and calcine the mesoporous silica film.

## CONCLUSION

The Appellant requests favorable consideration by the Board, a reversal of the Examiner's holding and a remand to the Examiner for an Office action in keeping therewith. If any questions remain, please call the undersigned.

Respectfully submitted,  
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